

## WHAT IS CLAIMED IS:

1. An exposure method for exposing a wafer having magnetic material by using an electron beam, comprising:
  1. placing said wafer on a wafer stage;
  2. calculating a correction value that corrects a deflection amount by a deflector that deflects said electron beam, based on an irradiation position on said wafer on which said electron beam is to be incident and a magnetic field formed by said magnetic material; and
  3. deflecting said electron beam based on said correction value to expose said wafer.
2. An exposure method as claimed in claim 1, wherein said calculation calculates said correction value further based on a distribution of said magnetic material on said wafer.
3. An exposure method as claimed in claim 1, wherein said calculation calculates said correction value further based on a wafer-placed position on said wafer stage at which said wafer is placed.
4. An exposure method as claimed in claim 1, wherein said calculation calculates said correction value further based on a positional relationship between said wafer and a magnetic field formed by an electromagnetic lens for converging said electron beam.
5. An exposure method as claimed in claim 4, wherein said calculation calculates said correction value based on said positional relationship between said wafer and said electromagnetic lens serving as an objective lens.
6. An exposure method as claimed in claim 1, wherein said

calculation calculates said correction value further based on a shape of said wafer.

7. An exposure method as claimed in claim 1, further comprising correcting a stage-position that is a position of said wafer stage, wherein said calculation calculates said correction value based on said irradiation position on said wafer placed on said wafer stage for which said stage-position has been corrected.

8. An exposure method as claimed in claim 1, further comprising forming a mark portion on said wafer,

wherein said calculation calculates said correction value further based on a positional relationship between said mark portion and said irradiation position on said wafer.

9. An exposure method as claimed in claim 1, further comprising:

- placing another wafer on said wafer stage;
- correcting another correction value that corrects said deflection amount by said deflector based on a positional relationship between said wafer-placed position of said wafer on said wafer stage and another wafer-placed position of said other wafer on said wafer stage, and said correction value for said wafer; and
- deflecting said electron beam based on said another correction value to expose said other wafer.

10. An exposure method for exposing a wafer by using an electron beam, comprising:

- placing said wafer on a wafer stage;
- calculating a correction value that corrects a deflection amount of said electron beam based on a positional relationship between said wafer and a magnetic field for converging said electron beam; and
- deflecting said electron beam based on said correction value

to expose said wafer.

11. An electron beam exposure apparatus for exposing a wafer having magnetic material by using an electron beam, comprising:

a wafer stage on which said wafer is to be placed;  
a deflector operable to deflect said electron beam; and  
a calculation unit operable to calculate a correction value that corrects a deflection amount of said electron beam by said deflector, based on an irradiation position on said wafer, on which said electron beam is to be incident, and a magnetic field formed by said magnetic material.

12. An electron beam exposure apparatus as claimed in claim 11, further comprising an electromagnetic lens operable to form a magnetic field to converge said electron beam,

wherein said calculation unit calculates said correction value further based on a positional relationship between said wafer and said magnetic field formed by said electromagnetic lens.

13. An electron beam exposure apparatus as claimed in claim 12, wherein said electromagnetic lens serves as an objective lens.

14. A fabrication method of an electronic device by exposing a wafer having magnetic material by using an electromagnetic lens, comprising:

placing said wafer on a wafer stage;  
calculating a correction value that corrects a deflection amount by a deflector for deflecting said electron beam, based on an irradiation position on said wafer, on which said electron beam is to be incident, and a magnetic field formed by said magnetic material; and  
deflecting said electron beam based on said correction value to expose said wafer.

15. A fabrication method of an electronic device as claimed in claim 14, further comprising forming a mark portion including at least a first mark portion in a first region in said wafer, wherein said placing of said wafer places said wafer with said first mark portion therein on said wafer stage, and said calculation calculates said correction value further based on a position of said first mark portion in said wafer.

16. A fabrication method of an electronic device as claimed in claim 15, further comprising:

storing said correction value in said first region; placing other wafer having magnetic material on said wafer stage; and irradiating said first region in said wafer with said electron beam based on said stored correction value in said first region and a position of said other wafer on said wafer stage.

17. A fabrication method of an electronic device as claimed in claim 15, wherein said formation of said mark portion includes:

applying resist on said wafer; exposing said resist by irradiating said first region with light to form said first mark portion in said first region; and exposing said resist by irradiating a second region in said wafer with light to form a second mark portion in said second region, wherein said calculation calculates said correction value in said first region further based on said position of said first region and calculates said correction value in said second region further based on a position of said second region, and wherein, in said exposure of said wafer, said electron beam is deflected based on said correction value in said first region in a case where said first region is irradiated with said electron beam, and is deflected based on said correction value in said second region in a case where said second region is irradiated with said electron beam.

18. A fabrication method of an electronic device as claimed in claim 17, wherein said formation of said mark portion includes forming a plurality of first mark portions in said first region and forming a plurality of second mark portions in said second region, and

said calculation calculates said correction value in said first region further based on relative positions of said first mark portions and calculates said correction value in said second region further based on relative positions of said second mark portions.

the *Journal of the American Statistical Association* (1952, 47, 377-385) and the *Journal of the Royal Statistical Society, Series B* (1954, 21, 204-215).